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Notice of Allowability

Application No.

09/841,938

Examiner

Jefferey F Harold

Applicant(s)

KURTZ ET AL.

Art Unit

2644

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendment filed October 14, 2004.
2. ☒ The allowed claim(s) is/are 1 and 7.
3. ☒ The drawings filed on 25 April 2001 are accepted by the Examiner.
4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|--|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date _____. |
| 3. <input checked="" type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____. |

DETAILED ACTION

Allowable Subject Matter

1. **Claims 1 and 7** are allowed.
2. The following is an examiner's statement of reasons for allowance:

Regarding **claim 1**, the prior art of record discloses a method for determining whether any of a predetermined set of tones present in a plurality of successive frames of digital samples of a received signal falls within a predetermined frequency tolerance, comprising the steps of: obtaining discrete Fourier transform pairs of In-phase and quadrature dot products of the samples and integer multiples of a base frequency, however, the prior art of record fails to disclose or fairly suggest wherein the base frequency being determined by the quotient of the sampling frequency and a multiple of the number of samples in successive ones of the frames; computing the quotients of the highest power ones of the products obtained on successive frames; using the quotients to approximate an arctangent function for ascertaining the phase of frequencies contained in successive frames; computing the phase change for each of the frequencies by subtracting the phase of a previous phase frame from the current frame; and subtracting an expected phase change from the computed phase change of the highest power ones of the products to determine the deviation of an observed tone from the predetermined frequency tolerance.

Regarding **claim 7**, the prior art of record discloses a method for determining whether any of a predetermined set of tones present in a plurality of successive frames of digital samples of a received signal falls within a predetermined frequency tolerance,

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comprising the steps of: obtaining discrete Fourier transform pairs of In-phase and quadrature dot products of the samples and integer multiples of a base frequency, however, the prior art of record fails to disclose or fairly suggest wherein the base frequency being determined by the quotient of the sampling frequency and a multiple of the number of samples in successive ones of the frames; computing an expected phase change between successive frames as the quotient of the quadrature and in-phase products for small absolute values of the quotient; approximating an arctangent function for the phase angle for the highest power ones of the products obtained on successive frames by the quotient of the quadrature and in-phase dot products for absolute values of the quotient; subtracting the expected phase change from the phase angle of the highest power ones of the products to determine the deviation of an observed tone from the predetermined frequency tolerance; the approximation of the arc tangent function Theta being performed as follows:

- (a) for $I \geq 0$, $Q \geq 0$, $A_I > A_Q$, and $0 \leq \text{Theta} \leq \pi/4$, $\text{Theta} = \text{Theta}_1$;
- (b) for $I > 0$, $Q \geq 0$, $A_I \leq A_Q$, and $\pi/4 \leq \text{Theta} \leq \pi/2$, $\text{Theta} = \pi/2 - \text{Theta}_1$;
- (c) for $I < 0$, $Q \geq 0$, $A_I > A_Q$, and $3/4\pi \leq \text{Theta} \leq \pi$, $\text{Theta} = \text{Theta}_1$;
- (d) for $I < 0$, $Q \geq 0$, $A_I < A_Q$, and $\pi/2 \leq \text{Theta} \leq 3/4\pi$, $\text{Theta} = \pi/2 + \text{Theta}_1$;
- (e) for $I \geq 0$, $Q < 0$, $A_I > A_Q$, and $-\pi/4 \leq \text{Theta} \leq 0$, $\text{Theta} = -\text{Theta}_1$;
- (f) for $I \geq 0$, $Q < 0$, $A_I < A_Q$, and $-\pi/2 \leq \text{Theta} \leq -\pi/4$, $\text{Theta} = -\pi/2 + \text{Theta}_1$;
- (g) for $I < 0$, $Q < 0$, $A_I > A_Q$, and $-\pi < \text{Theta} \leq -3/4\pi$, $\text{Theta} = -\pi + \text{Theta}_1$; and
- (h) for $I < 0$, $Q < 0$, $A_I < A_Q$, and $-3/4\pi \leq \text{Theta} \leq -\pi/2$, $\text{Theta} = -\pi/2 - \text{Theta}_1$;

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where I is the In-phase component; Q is the quadrature component; AI is the absolute value of I; AQ is the absolute value of Q; Theta 1 is the absolute value of AQ/AI .

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

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Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jefferey F Harold whose telephone number is 703-306-5836. The examiner can normally be reached on Monday - Friday 9 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Forester W Isen can be reached on 703-305-4386. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



JFH
December 1, 2004



Jefferey F Harold
Examiner
Art Unit 2644



FORESTER W. ISEN
SUPERVISORY PATENT EXAMINER